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AUTHOR Nacke, Phil L.
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ABSTRACT

An integral dimension in the concept of flexible efficient reading is the process of skimming, which is defined as the reading behavior in which information is processed without looking at all or most of the words in continuous printed discourse. Measurement of flexible reading efficiency presents problems which revolve around four major issues. The first issue is concerned with the difficulty of measuring the faster rates of reading or those strategies involving the use of visual contextual restraint, i.e. skimming. Measuring comprehension poses the second major difficulty, since careful reading is implied in the usual survey or diagnostic test. The small number of comprehension questions used and the variation of the reader's background of information contribute to the problem. The third issue arises over the controversy as to which should be the independent variable--variations in purpose for reading or variations in difficulty and type of material. The fourth important issue is concerned with the need for valid and reliable flexibility scales whereby the rate and comprehension scores on the activities of the instrument are integrated. A bibliography is included. (Author/DH)

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ISSUES RELATING TO THE ASSESSMENT OF FLEXIBLE EFFICIENT READING

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Phil L. Nacke
Jersey City State College
Jersey City, New Jersey

The importance of the concept of flexibility in reading has been recognized, to some extent at least, for over forty years. As Harris (11) has pointed out, there has been little argument about whether an efficient reader should make appropriate variations in his rate of reading to fit his purposes for reading and the type of reading material since Yoakam (34) in 1928 categorized four main rates of reading: slow, careful reading; normal or "usual" reading; rapid reading; and skimming.

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Skimming in Flexible Reading

In general, the idea of flexible reading has been used to embrace the implications of efficient reading. However, efficient reading has not necessarily included the concept of flexibility, the appropriate adjustment of reading rate or using different reading strategies. Flexible efficient reading refers, in short, to the process of securing from the printed page in the shortest possible time and with the minimum of stimulus input that meaning or information which is dictated by the reader's specific, immediate and long-term purposes. Flexibility in reading is predicated upon the assumption that the reader is capable of using a range of reading rates, i.e. a range in the sense of a continuum from slower to faster. Adjusting reading speed has not been clearly distinguished from the idea of using different reading strategies. However, it seems apparent that one of the important strategies required for flexible efficient reading is the skimming strategy.

It can be argued that skimming is an integral dimension of flexible reading performance. This is true by virtue of defining skimming as that reading behavior in which information is processed without looking at all or most of the words in the continuous printed discourse. Thus, skimming necessarily involves a kind of functional, visual contextual restraint. Spache (26), Taylor (29) and Tinker (30,31,32) on the basis of their extensive studies involving eye-movement photography, have all asserted that any rates in excess of 800-900 wpm necessarily must be considered to be skimming rather than reading, which Spache (26) defines as "looking at most of the words on the printed page." This means that a reader must skim, i.e.

he must use visual contextual restraint, if he is to achieve rates in excess of, say, 800 wpm. In practice, readers may very well adopt a skimming strategy at rates well below 800-900 wpm, which is considered to be the maximum rate at which individuals are normally able to read without looking at all or nearly all of the words in the discourse.

Theoretically, at least, the use of visual contextual restraint suggests that the reader will look at or fixate upon those parts of the discourse which communicate the most meaning or information. In general there are two strategies which the reader can adopt in the process of skimming. One approach is to look at all or most of the words in selected sentences and to refrain from looking at the other sentences in the paragraph altogether. This is sometimes referred to as the topic sentence approach. The other basic approach to skimming involves looking only at the most information-bearing words in most of the sentences in the discourse. This is called the key word approach.

Nacke (21) recently conducted an investigation of skimming behavior in which both the strategy variable and the amount of processing time were carefully controlled. The results of this investigation tend to support the idea of skimming by looking only at the key words in the continuous discourse. At any rate, it is essentially through skimming that a person is able to achieve the faster speeds in flexible reading. Further, one of the major complications of assessing flexibility rests in the fact that to the present, no satisfactory test of skimming performance has been developed.

Factors Affecting Flexible Rates

The three primary factors generally considered to affect the speed with which printed material can be read are:

1. the reader's purpose for reading, both internal and external
2. the level of difficulty of the material, terminology and level of ideation
3. the degree of familiarity or prior knowledge of the subject matter.

Consideration of these three factors reveals that they are not mutually exclusive. The level of difficulty may be influenced by a person's prior knowledge and the difficulty may also affect the purpose or degree of mastery and recall which a reader sets as his goal. Too, as Braam (4) pointed out in connection with the basic problems concerning the evaluation and control of the factors relating to flexibility, "the purpose for which a person reads may be the result of needs arising from external, internal, or combined external-internal motivation." Carillo (9) has suggested that other factors which influence flexibility include the typography, external distractions (any situation which diverts attention), the interest and energy level of the reader.

Letson (13,15), Sheldon and Carillo (25) along with Spache (27) and McDonald (17) discussed at length the complexity of the skills referred to as flexibility. Since that time there seems to have been little progress toward clarifying the issues or resolving the problems associated with the measurement and nature of flexibility in reading. The literature still reveals considerable disagreement about the specific nature of flexibility, as well as the ways of measuring it. Attention in the rest of this paper will focus primarily on the issues associated with the assessment of flexible efficient reading.

Existing Tests of Flexibility

The formal tests currently available for assessing reading flexibility are the Reading Versatility Test by McDonald and others (20) and the Flexibility

of Reading Test by Braam and Sheldon (5).

There is a fundamental difference between the Reading Versatility Test and the Braam-Sheldon instrument. In the former, the reader is directed to read four similar selections for four distinctly different purposes: rapid reading, thorough reading, skimming for main ideas, and scanning to find the answer to one specific question. On the other hand, Braam and Sheldon ask the reader to get thorough understanding on each of five selections which differ in subject matter or content area and in level of difficulty. Both tests are administered in a time-amount situation rather than a time-limit condition.

The Braam-Sheldon test seems to be based upon a definition of flexibility which does not provide for the application of different reading strategies since the purpose for reading remains constant. Presumably, then, variations in rate among the passages for individuals would be accounted for as the combined effect of such variables as processing or thinking time, familiarity with content, interest and motivation. Another troublesome aspect of this instrument is the fact that comprehension is checked by means of the true-false items for each passage. Berger (1,2) has developed multiple-choice test items for the Flexibility of Reading Test, however, which would seem to be some improvement.

There remains the question, with all multiple-choice comprehension test items, of the extent to which the questions do reflect the true amount of information gained. This is certainly true for the Reading Versatility Test, particularly with regard to the problem of measuring the comprehension of main ideas for which three questions are provided. Maxwell (16) has made the

distinction that the Reading Versatility Test does give an indication of whether a person is able to skim or not, but that it does not reveal the extent to which he has developed the ability to skim.

Spache and Berg (28) developed a test of flexibility which is now out of print. The procedure for this test required the reader to process a single article several times, each of which was prompted by a different specified purpose. This rationale could combine features of the Flexibility of Reading Test and the Reading Versatility Test if it were applied to passages representing several levels of difficulty. It seems to deserve further consideration.

Raygor (24) has developed a test which inherently includes some aspects of flexibility in that it provides rate and comprehension scores on an easier passage and more difficult one. In addition, there is a 30-item skimming and scanning time-limit test. In reality it seems to be much more of a scanning test than one of skimming in that the task is one of finding the answers to the questions in indexes, charts and other formats found in textbooks. The opportunity for skimming is minimal and is obscured in the directed-reading activity anyway. Therefore, it would seem more appropriate to refer to this subtest simply as a scanning activity. This would also help to minimize the confusion regarding the definitions of skimming and scanning.

The Iowa Silent Reading Test is in the process of being revised and, according to Roger Farr, the new version will also include a subtest on scanning variations on the directed reading activity.

Carver and Darby (8) have recently developed a test which gives a reading efficiency score (along with an accuracy and a rate score). This efficiency score, however, is not one which overtly accounts for the application of various

strategies including skimming. A promising feature of the Carver-Darby Chunked Reading Test is the unique way in which information gain or comprehension is assessed. The following explanation of the technique is taken from the test manual (8):

> The chunked test items on each reading passage consist of the same passage retyped in 100 groups of words--each group known as a "chunk"--in 20 sets of five chunks each. A "chunk" is a group of from one to five meaningfully related words within a sentence. Within each set of the five chunks one chunk has been changed in meaning from the original passage. The examinee's task for a single test item is to identify the changed chunk in each set of five chunks.

In addition to the formal tests of flexibility in reading, Letson (14) has presented procedures for measuring flexibility informally. Maxwell (16) has discussed briefly the use of informal time-limit activities.

Rankin and Hess (23) have developed a new method of measuring internal or intra-article reading flexibility. This procedure, although not standardized, has the distinct advantage of revealing the degree of reading flexibility in the form of a flexibility coefficient. This coefficient is determined by computing a Pearson correlation between the distribution of successive rate measurements (the number of fifteen-second intervals required for processing 100-word segments) and the distribution of successive difficulty measures (cloze scores per the same 100-word segments). The levels of difficulty within the stimulus passage is the independent variable, here, rather than variations in the reader's purpose.

Other Factors in Measuring Flexibility

Carver (7) has suggested that two of the most important variables for predicting information gained or retained from prose materials are the strategy (plan, program) that the individual uses in the learning (reading) situation and the amount of time which the person spends in the learning process.

When the time-amount method is used to measure flexible reading performance it does not seem likely that reliable information can be obtained with regard to the strategy variable for one then knows only the extent to which the processing time was used effectively (providing background information was properly controlled). If genuine progress is to be made in investigating the nature of flexible efficient reading, it is extremely important to ascertain objective information about the strategy or procedure which the reader adopted during the specified processing time. In other words, it is expedient that we learn how the reader is spending his time, whether he is skimming, scanning, skipping, reading each word or re-reading. Rankin's flexibility coefficient takes the strategy variable into account to some extent.

The amount of background information which a person has about the subject matter or content of the stimulus passage is commonly considered to affect reading performance (12,17). The argument is that the reader who has more background information about the subject matter of a passage will find the material easier to read than a person who has little or no background information about the topic. Weaver (33) has suggested that reading in most situations is actually a "selecting of the parts of what we already know." Reading in this sense becomes essentially a process of confirming what the reader already knows, particularly if the reader is responding primarily to the cues in the material about which he already has information. Weaver's point of view may be even more relevant to the process of skimming, or rapid and efficient reading in general, than it is to reading carefully and intensively, or to reading slowly. Certainly, a reader must, at the least, know the meanings of referential words in a passage and be able to make some appropriate associations among the

meanings to gain information from the printed discourse. Otherwise, decoding printed discourse is not possible at all, for reading necessarily requires some level of background information. That the amount of background information is closely related to the skimming performance of grade eleven students has been verified by Nacke (21).

Reading comprehension has typically been measured without ascertaining the amount of previous information which Ss had about the subject matter before reading the material (12). Since it is known that individuals vary greatly in the amount of background information which they possess, it is readily conceivable that two persons could obtain the same score on a comprehension test after reading a given passage even though they differed significantly in the amount of specific background information which they had before reading the passage. One person may have gained a great deal of information from reading, while the other person may have gained very little information that he did not possess prior to reading. It is extremely important, therefore, to assess the amount of previous information which readers have before reading in order to determine the amount of information gained from reading (22). Information gain is typically measured by administering a pre-test as well as a posttest of comprehension. The information gain score is calculated by computing the difference between the pretest score and the post-test score for each individual.

Exposure to a pretest, however, can be a confounding variable in research. Nacke (21) found that exposure to a set of questions related to the content of stimulus passage served to induce familiarity with the content of the passage and apparently served to cue the reader to look for specific answers

to questions when he subsequently skimmed the passage. In fact, skimming in this study was observed to be effective in some instances only when there was cueing resulting from exposure to the pretest. The implications of these results appear to complicate the task of developing functional and objective instruments for flexible reading behavior since background information has been verified as a significant variable relating to skimming and, at the same time, the pretest, which is used to control the background information variable, itself is a confounding variable.

The pre- and post-cloze approach to measuring information gain apparently has not been applied to the measurement of skimming performance. An investigation designed to determine the relative merits of multiple-choice questions and information gain as measured by 20 per cent key-word cloze tests is in progress.

Even if the key-word cloze form of test is found to be a valid and reliable method for measuring information gained by skimming, it is still not likely that the cloze test would solve the problem of pre-test confounding. In fact, it is probably more likely to exaggerate the problem.

Carver (6,8), however, claims that his chunked test items measure information stored during the reading process by virtue of the way in which the test questions were developed, i.e. no-reading vs reading. Herein, may lie at least a partial solution to the problem of measuring flexible efficient reading with multiple-choice questions without administering a pre-test. At the present, the chunked test item or variations thereof appear sufficiently promising as to merit further investigation.

Summary

In summary, then, the problem of measuring flexible reading centers around four major issues. The first issue concerns the particular difficulty

of measuring the faster rates of reading or those strategies involving the use of visual contextual restraint. Rate of reading (as words per minute or words dealt with per minute) may be misleading even if the timing is accurate since it typically does not reveal the reader's strategy, or pattern of attack, whether he skipped words, reread parts, or read every word once. Time-amount measurements generally have not proven satisfactory. Time-limit assessments appear to be more promising in that a suggestive profile of the internal processing is revealed. Overall, the strategy variable in the measurement of reading has not received adequate attention.

The second major difficulty, superimposed on the first, is concerned with the perennial problem of measuring comprehension, which is necessarily rate of comprehension when considering flexible efficient reading. The task here is even more difficult than in the usual survey or diagnostic test, where the directions normally dictate or imply careful, thorough reading. In flexible efficient reading, the reader does not always need to achieve thorough understanding in materials with different levels of difficulty and at the various rates. The types of main-idea and specific-information questions asked by the test author may or may not be appropriate for a specific reader depending upon the reader's internalized purpose in a specific content, his background information and interest in the topic. Further, the notoriously small number of questions used to evaluate the ability to skim for important ideas and to scan for the answer to specific questions is less than satisfactory both in terms of evaluating an individual's rate of comprehension at the given level and in comparing subjects' effectiveness in skimming and scanning. In the same realm, there is the problem of taking into account the reader's

background information and the complication of controlling this variable through pretesting.

The third major problem, also closely allied to the first problem, relates to the controversy over whether variations in purpose for reading or variations in difficulty and type of material should be the independent variable. Perhaps it is becoming more apparent that both factors must be manipulated in order that the conditions of testing adequately reflect the opportunities which the mature reader has for reading flexibly and efficiently in the real world. On the other hand, there remains the difficulty of determining the extent to which the reader accepts or internalizes the various purposes (or strategies) for reading as stated in test directions. Again, this seems to be of particular concern in view of the fact that the reader's previous experiences with tests and other academic activities, either explicitly or implicitly, required careful, intensive reading.

The fourth important issue is concerned with the development of a functional index or scale of flexibility whereby the rate and comprehension scores on the activities of the instrument are integrated. The use of ratios between rate scores does not take into account the respective comprehension scores except as they are deemed to be either satisfactory or unsatisfactory. In addition, the use of ratios allows the subtests to be considered only as pairs.

The procedure of multiplying the individual rate scores by the respective comprehension percentage scores is even less satisfactory as a procedure for establishing an index of flexibility. In the first place, it puts an unreasonable premium upon the quality of the comprehension questions. In the second place, the invalidity of the procedure has been clearly illustrated

by Farr (10). Anyway, the result was still a score for each subtest or activity rather than an index score reflecting the reader's flexibility. The range score does not provide an adequate indication of flexibility.

The flexibility coefficient developed by Rankin and Hess (23) as discussed above is the most creative attempt to solve this problem to date.

An additional point should be made clear. While informal tests can provide valuable diagnostic information upon which inferences can be made for instruction, measures of flexible efficient reading which are adequate for research purposes apparently have not yet been developed.

Conclusion

If the assessment of reading skills is a complex and controversial task which many specialists have attempted to resolve with a measure of objectivity and consistency but with only limited success, then assessment of flexibility in reading is a challenge with a higher order of complexity, even greater disagreement as to criteria and, indeed, one which has resulted in considerably less success to date. If flexibility and efficiency are the distinguishing characteristics of the mature reader, then it is imperative that valid and reliable measures of flexible efficient reading be developed. The objective measurement of flexible efficient reading behavior is fundamental for the development of a sound theory or model of this construct. At the same time, it is clear that a functional theoretical base must be established in conjunction with the development of appropriate objective measures. The current concern about accountability may very well focus on the urgency and establish a high priority for developing a sound measure of flexible efficient reading.

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